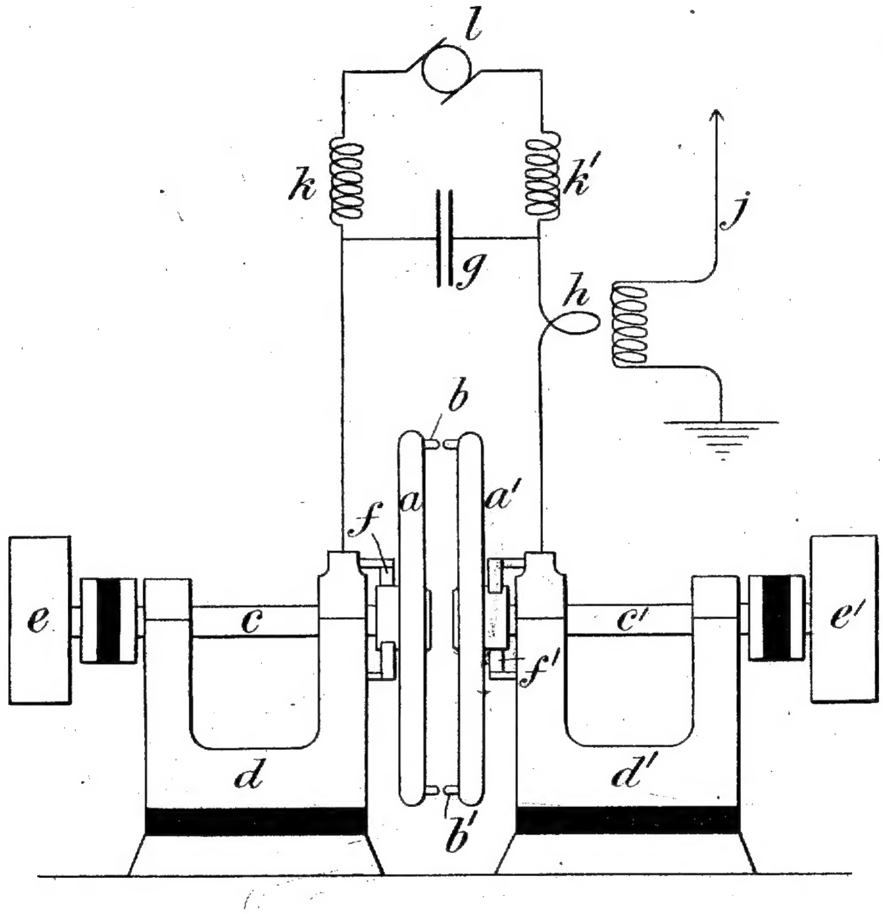
G. MARCONI.
APPARATUS FOR WIRELESS TELEGRAPHY.
APPLICATION FILED MAR. 31, 1909.

**954,640.** Patented Apr. 12, 1910.



Witnesses
Edw. W. Vail Jr.
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# UNITED STATES PATENT OFFICE.

GUGLIELMO MARCONI, OF LONDON, ENGLAND, ASSIGNOR TO MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## APPARATUS FOR WIRELESS TELEGRAPHY.

954,640. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed March 31, 1909. Serial No. 487,067.

*To all whom it may concern:*

Be it known that I, GUGLIELMO MARCONI, LL. D., D. Sc., a subject of the King of Italy, residing at Watergate House, Adelphi, London, England, have invented new and useful Improvements in Apparatus for Wireless Telegraphy, of which the following is a specification.

This invention relates to transmitting apparatus for wireless telegraphy in which the discharge takes place across a small gap between discontinuous metal surfaces in relative motion at a very high speed.

According to this invention the moving surfaces consist of pegs or studs on the adjacent faces of two parallel disks fixed to two shafts in a line with each other and revolved in opposite directions, the shafts being mounted in insulated bearings. In place of the disks being parallel they may be set at an angle but this is not so advantageous.

The accompanying diagram shows a transmitting apparatus made in accordance with this invention.

*a* and *a'* are the tw parallel disks respectively provided with pegs or studs *b* and *b'* and mounted on shafts *c* and *c'* which are carried in bearings *d* and *d'*. The studs are preferably equally spaced and the numbers of the studs on the two disks are equal.

*e* and *e'* are motors or pulleys for connecting to motors, by means of which the disks *a* and *a'* are driven in opposite directions.

The bearings *d* and *d'* are insulated from the ground, and the motors or pulleys *e* and *e'* are respectively insulated from the shafts *c* and *c'*.

The parallel disks *a* and *a'* are connected by means of brushes *f* and *f'* to the plates of a condenser *g* and this condenser circuit is coupled at *h* to the aerial *j*. The plates of the condenser *g* are also connected through suitable inductances *k* and *k'* to a generator *l* so as to form an oscillation circuit. Disks two feet in diameter having each two studs and running at a speed of 3000 revolutions per minute are found to work well in practice. It is found moreover that far better results are obtained with studs of copper than with studs composed of any other material.

In order to obtain the best results it is necessary to give such values to the condenser *g* and inductances *k* and *k'* as will make the time period of this circuit equal to or some integral multiple or submultiple of the interval of time between two successive discharges of the condenser. The time period of this circuit is approximately equal to

$$2\pi\sqrt{CL}$$

where C is the capacity of the condenser in farads and L is the inductance of the whole circuit in henrys. The interval of time between two successive discharges of the condenser is equal to $1/N(X_1+X_2)$ where N is the number of pegs or studs on either revolving disk, $X_1$, is the number of revolutions per second of one disk and $X_2$ is the number of revolutions per second of the other disk. The right value of the inductance *k* and *k'* can therefore be determined from the equation:—

$$2m\pi\sqrt{CL}=\frac{1}{N(X_1+X_2)}$$

where *m* is an integer.

By means of this invention it is possible to discharge the condenser twice as rapidly as with a single revolving disk, while owing to all the pegs on one side being opposite to the pegs on the other disk at the same instant the discharge may take place at any of the pegs. By this invention it is moreover possible to efficiently utilize a large amount of power, and to emit oscillations in regular groups of a frequency to which an appropriate receiver may be tuned, and such as to produce in a telephonic receiver a note which is readily distinguished from the noises caused by atmospheric disturbances.

What I claim is:—

1. In a wireless telegraph transmitter the combination of two parallel disks, means for rapidly rotating the disks in opposite directions, studs equally spaced around the adjacent faces of the disks and an oscillation circuit connected to the disks.

2. In a wireless telegraph transmitter the combination of two disks having oppositely disposed parallel faces, means for rapidly rotating the disks in opposite directions, an equal number of studs equally spaced around

that face of each disk which is adjacent to the other disk, and an oscillation circuit connected to the disks.

3. In a wireless telegraph transmitter the combination of two parallel disks, means for rapidly rotating the disks in opposite directions, an equal number of studs equally spaced around that face of each disk which is adjacent to the other disk, and an oscillation circuit connected to the disks.

GUGLIELMO MARCONI.

Witnesses:
P. C. MAPINI,
HENRY W. ALLEY.

## Correction in Letters Patent No. 954,640.

It is hereby certified that the names of the witnesses to the signature to the specification of Letters Patent No. 954,640, granted April 12, 1910, upon the application of Guglielmo Marconi, of London, England, for an improvement in "Apparatus for Wireless Telegraphy," were erroneously printed "P. C. Mapini and Henry W. Alley," whereas said names should have been printed *R. E. Maquire and Henry W. Allen;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of May, A. D., 1910.

[SEAL.]

C. C. BILLINGS,
*Acting Commissioner of Patents.*

that face of each disk which is adjacent to the other disk, and an oscillation circuit connected to the disks.

3. In a wireless telegraph transmitter the combination of two parallel disks, means for rapidly rotating the disks in opposite directions, an equal number of studs equally spaced around that face of each disk which is adjacent to the other disk, and an oscillation circuit connected to the disks.

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